Air gap measuring and adjusting on AF8 retarder range

The following instructions define how to measure and adjust the air gap on Axial retarders LM/LN/LP/LR/LTxxxxxx

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1. TELMA GENUINE SPARE PART NEEDED

For any spare parts orders, it is necessary to specify the part number of the retarder the model, engraved on the front stator housing, in the upper left corner.

You will find the necessary information on spare parts for this equipment in the spare parts catalogue:

OC443068 Spare Parts AF8 Telma Retarder

For more information about your TELMA product, please contact your TELMA dealer or the TELMA technical department.

2. SAFETY PRECAUTIONS

Before repairing your retarder, you must have read this maintenance manual thoroughly.

All operations and interventions for repairing this retarder will be carried out by qualified personnel.

Our technical support is available for all the information you may need.

The various operations described in this manual are accompanied by recommendations or symbols to alert the user to the risk of accidents. You must understand and respect the following warnings below.

Using and safety warning symbol, for an operation capable of damaging or destroying the retarder or surrounding equipment. The no respect of these warnings can cause injuries from mild to severe.

Safety warning symbol for an immediate danger to personnel. The no respect of this warning can cause serious injuries.

Safety warning symbol for an electrical danger to personnel. The no respect of this warning can cause serious injuries.

The repair methods described by TELMA SA, in this document, are based on the technical specifications in effect at the date of this writing. They are subject to modifications in case of changes done by TELMA SA to manufacture the various component units and complete products.

The TELMA SA company reserves the right to modify the characteristics of its products at any time in order to incorporate the latest technological developments. The information contained in this document are subject to change without notice.

- We would like to draw your attention to the contents of this maintenance manual. Indeed, following the respect of important points during installation, use and maintenance of your retarder will ensure trouble-free operation for many years.
- When using lifting equipment, do not walk or stand under suspended loads.
- For information, a complete retarder weights around 330 kg (728 lb), a rotor with coupling flange weights about 63kg (139 lb), and a hub weights 5.5 kg (12 lb).
- Put the retarder on a solid table, with the handling safety tool.
- Pay attention to the heavy parts of the retarder which can cause serious personal injury.

3. REQUIRED TOOLS

- Protective glasses and gloves
- Handling safety tools for retarder
- Flat screwdriver
- Torx® TX40 socket
- Click-type wrench
- 10 mm long socket and 19mm socket
- Tab washer driver (See Annexe 1)
- Hammer
- Feeler gauge
- Dial gauge with magnetic base
- Ink marker
- Torque wrench (range up to 100Nm)
- Abrasive cloth (120 grade)

4. PARTS TO BE REPLACED SYSTEMATICALLY

When they have been removed the following parts need to be changed.

- Shaft end screws, washers, and lock tabs
- Air gap adjusting shims

Note:

Some parts handled during the maintenance operations are covered with a special product against corrosion. Take precautions when handling to prevent damage to these protections.
For ease and given the diversity of installations on vehicles, this procedure has been done with the retarder removed from the vehicle and its accessories (retarder brackets) removed from the retarder.

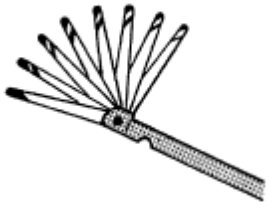
To remove the retarder brackets, please refer to the appropriate procedures.

The different pictures on this procedure are generic views and are not contractual.

5. AIR GAP MEASUREMENT

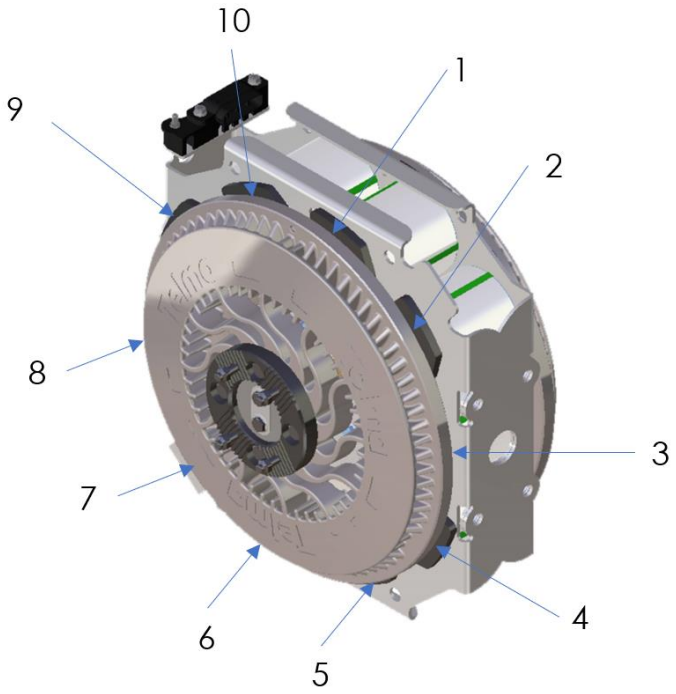
These instructions define how to measure and verify the Axial retarder air gaps.

The measurement will be done on a static basis, with the rotors at the same angular orientation all the time during the operations. The required tools are feeler gauges as shown:



The operations are the following:

- Measure with the gauges the distance between the first rotor (gearbox side) and the pole shoe in front of it.
- Make the measure at the centre of each of the 10 pole shoes.



- Calculate the mean value X of the 10 measured gaps.
- Compare this mean value X with the value of the theoretical air gap E.
- If the mean value X is lower than E, the difference e corresponds to the thickness of the shims to be added:

  E – X = e to be added

- If the mean value X is higher than E, the difference e corresponds to the thickness of the shims to be removed:

  X – E = e to be removed

- If the mean value X is equal to E, then the air gap adjusting is correct.
- Make the same operations for the second rotor (drive axle side).

Measurement example:

The theoretical air gap of the Axial AF81-80 retarder is:

E = 1.30 mm (with tolerances of 0 to -0.20 mm).

The measured values are for example:

- Pole shoe 1: 1.00 mm
- Pole shoe 2: 1.02 mm
- Pole shoe 3: 1.05 mm
- Pole shoe 4: 1.07 mm
- Pole shoe 5: 1.09 mm
- Pole shoe 6: 1.08 mm
- Pole shoe 7: 1.04 mm
- Pole shoe 8: 1.02 mm
- Pole shoe 9: 0.99 mm
- Pole shoe 10: 0.98 mm

The mean value will be:

X = (1.00 + 1.02 + 1.05 + 1.07 + 1.09 + 1.08 + 1.04 + 1.02 + 0.99 + 0.98) / 10 = 1.03 mm

The X value of the average air gap is lower than the theoretical value E:

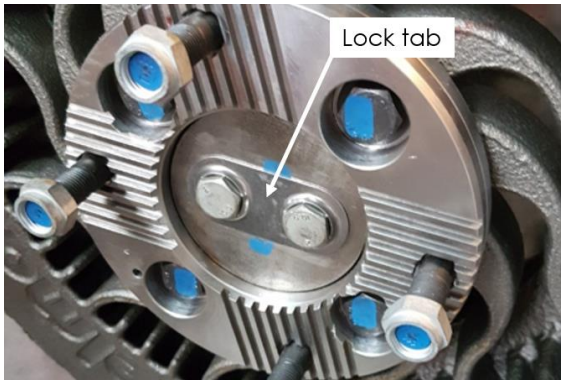
E – X = e = 1.30 – 1.03 = 0.27 mm

A shim thickness of e = 0.27 mm needs to be added on the gearbox side rotor. As the set VB100170 only contains shims of 0.25mm, 0.30mm, 0.40mm, 0.50mm and 0.70mm, it will be necessary to remove for example one shim of 0.25mm from the retarder and to add one of 0.50mm . The average air gap value would then be 1.28 mm instead of 1.30 mm which is within the tolerance.

VB100170 Set of air gap adjusting shims, including:

- 5x Shims (thickness 0.25 mm)
- 3x Shims (thickness 0.30 mm)
- 3x Shims (thickness 0.40 mm)
- 10x Shims (thickness 0.50 mm)
- 2x Shims (thickness 0.70 mm)

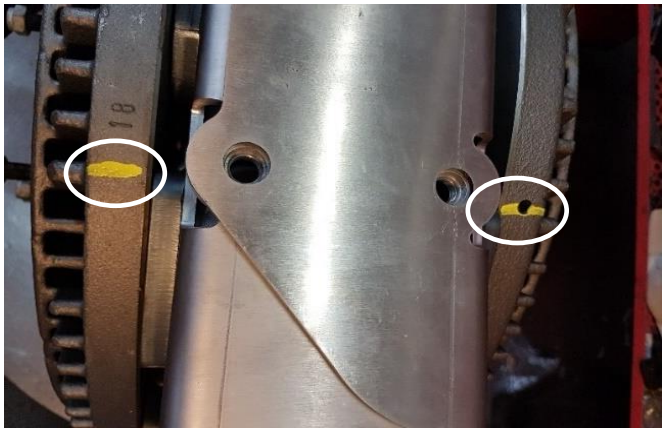
VA1002092 Set of 20x lock tabs

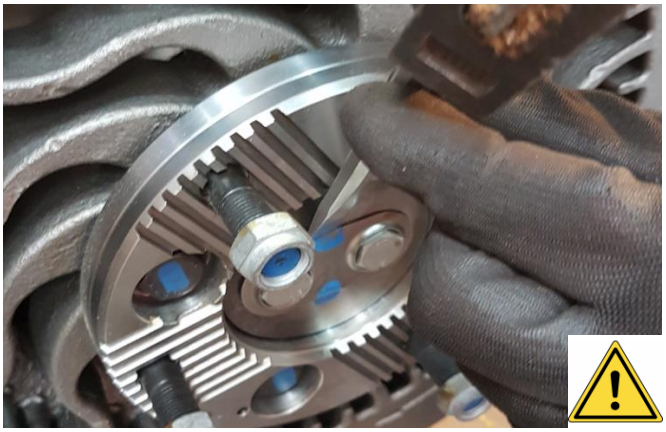


6. DISMOUNTING OF THE ROTORS

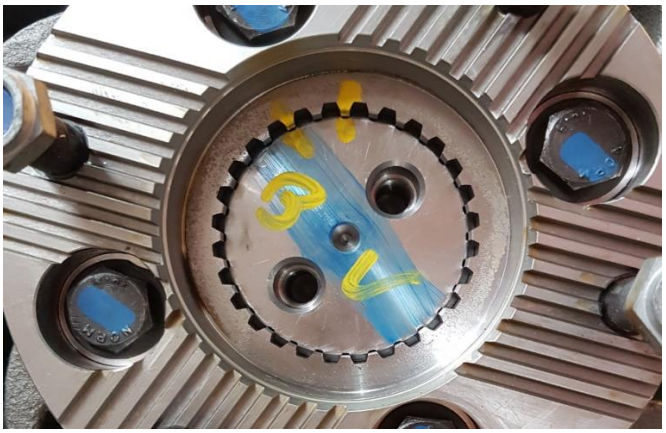
IMPORTANT: identify all parts before dismantling in order to find their initial orientations and location during the re-assembly.

7-1	7-2
Draw a mark on each rotor outer edge with an ink marker, the two marks must be aligned to find again the initial angular orientation during re-assembly. This is essential to maintain proper balancing.	On the first retarder side (for instance here the gearbox side, with the engraved part and serial numbers), remove the lock tab by using a flat screwdriver and a hammer. Caution: in order to reduce the spring effect, suppress the stress in the tab by hitting on one side and by removing the other).



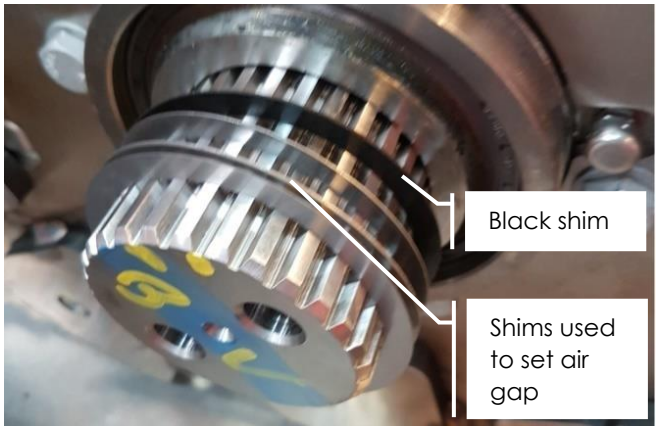


7-3	7-4
Unscrew the 2 shaft end screws to remove them. Use a 19mm socket and a bar to lock the rotation of the rotor.	Draw a mark on both shaft and coupling flange with an ink marker, to find again the initial position.



7-5	7-6
Insert a lifting hook between 2 cooling fins on the frontal face of the rotor to facilitate pull off of the rotor and coupling flange assembly.	Remove the dust shield from the shaft.

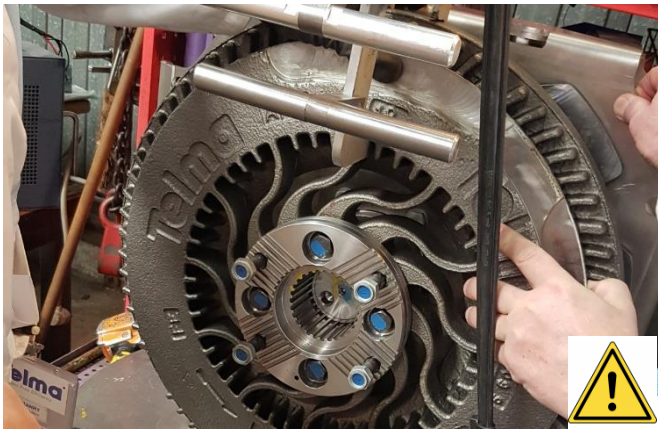
7-7
Depending on the calculation result of paragraph 6 add or remove air gap adjusting shims Important! Leave the black shim (Nuflon) on the shaft splines against the bearing.

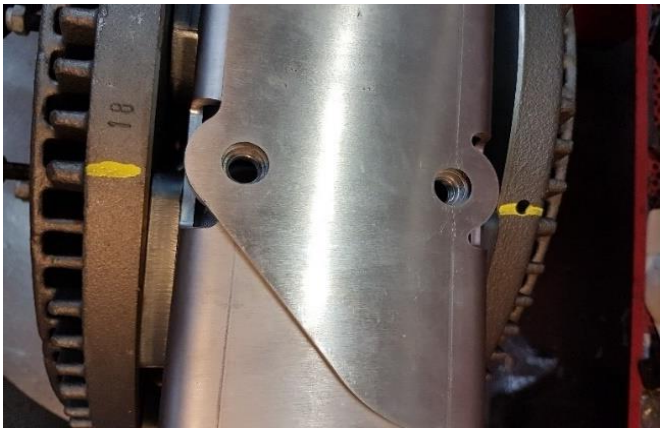


7. INSTALLATION OF THE ROTORS

8-1	8-2
Lift up the stator in vertical position. On both ends of the shaft, put in place a new black shim and new air gap adjusting shims with a thickness to the one removed in step 6A-7. Note: the black "Nuflon" coated shim must be installed first; its presence is mandatory in any case.	Put new dust shields on both shaft ends.

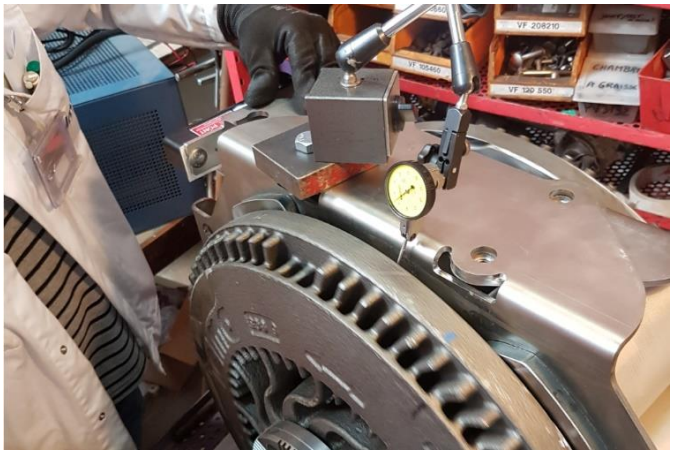
8-3	8-4
Re-install both rotor with coupling flange assemblies on the shaft, ensuring that the marks painted on the shaft splines and on the coupling flange splines (refer to picture 6A-4) are aligned.	When fitting the second rotor, ensure that both marks painted on the outer edges of the rotors are aligned.



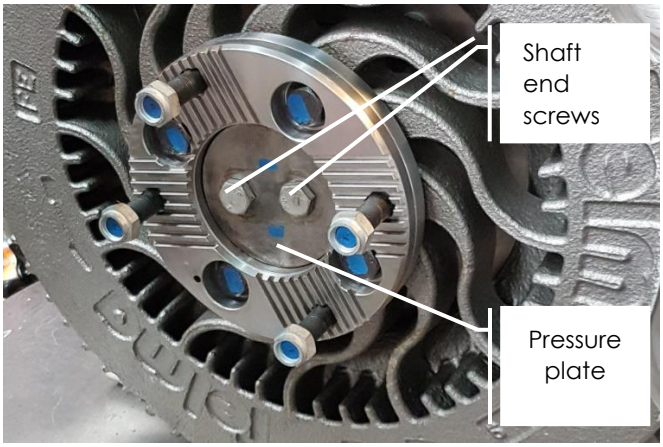


8-5	8-6
Re-install both removed shaft end screws with the removed pressure plates, on both retarder sides. Do not install lock tabs yet.	With a manual torque wrench apply a tightening torque value of 60 Nm ± 20% (44 lb.ft ± 20%) alternately on these 2 screws. Use a 19mm socket and a locking bar to be inserted inside a rotor cooling canal for preventing rotor rotation.

8-7	8-8
Check the axial run out of the rotors by using a dial gauge with magnetic base. Maximum allowed value: 0.28mm Note: should the measured value be higher than 0,28mm, please contact the technical department at TELMA SA.	Measure the air gaps by using a feeler gauge. Do not turn the rotors and measure the air gap between the rotor and each pole shoe. The average of these 10 values must be conform with values mentioned in retarder technical specifications: 1.30mm $^{0}_{-0.20}$.



8-9	8-10
After having adjusted the air gaps, on each retarder side, unscrew the removed shaft end screws and the removed pressure plate. Install 2 new shaft end screws and a new pressure plate supplied with the replacement hub assembly.	With a manual torque wrench, apply a tightening torque value of 60 Nm ± 20% (44 lb.ft ± 20%) alternately on these 2 screws. Use a locking bar to be inserted inside a rotor cooling canal for preventing the rotation of the rotor.



8-11	8-12
Insert a new lock tab in the retaining tab driver On each retarder side, put in place the lock tab over the screw heads and hit with a hammer.	Check that the lock tabs are well bottomed over the shaft end screw heads.